Tunable metasurfaces (Presentation Recording)

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ABSTRACT

Metasurfaces composed of sub-wavelength artificial structures show promise for extraordinary light-manipulation and development of ultrathin optical components such as lenses, wave plates, orbital angular detection, and holograms over a broad range of the electromagnetic spectrum. However structures developed to date do not allow for post-fabrication control of antenna properties. We have investigated the integration of the transparent conductor indium tin oxide (ITO) active elements to realize gate-tunable phased arrays of subwavelength patch antenna in a metasurface configuration to enable gate tunable permittivity. The magnetic dipole resonance of each patch antenna interacts with the carrier density-dependent permittivity resonance of the ITO to enable phase and amplitude tunability. Operation of patch antennas and beam steering phased arrays will be discussed.

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